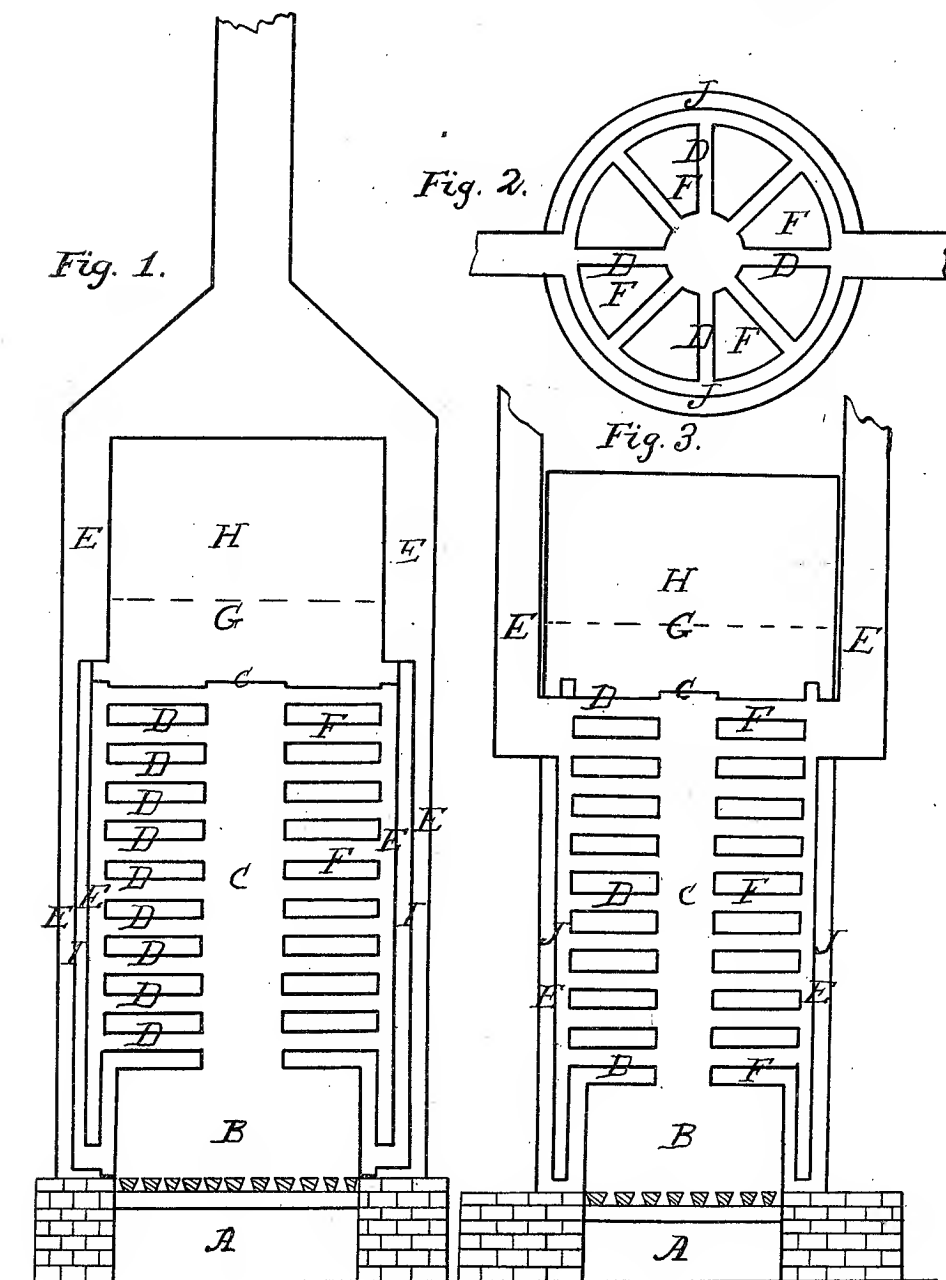


*J. W. & E. Strange,*  
*Steam-Boiler Water-Tube.*  
*Patented Sep. 29, 1836.*



# UNITED STATES PATENT OFFICE.

JOSEPH W. STRANGE AND ELIAS STRANGE, OF TAUNTON, MASSACHUSETTS.

## IMPROVEMENT IN VERTICAL CYLINDRICAL STEAM-BOILERS.

Specification forming part of Letters Patent No. 34, dated September 29, 1836.

*To all whom it may concern:*

Be it known that we, JOSEPH W. STRANGE and ELIAS STRANGE, of Taunton, in the county of Bristol and State of Massachusetts, have invented an Improvement in Vertical Cylindrical Steam-Boilers; and we do hereby declare that the following is a full and exact description thereof, reference being had to the drawings which accompany and make a part of this specification.

In this boiler the furnace and ash-pit are situated in the manner common to vertical cylindrical boilers, and as we generally construct it we employ three concentric cylinders, the middle one of which constitutes the main flue immediately above the furnace, and between which and the second cylinder the main body of the water to be heated is contained. The space between the second and outer cylinder forms an exterior flue surrounding the boiler, and within it also are contained tubes leading from the upper to the lower part of the boiler for the circulation of water in a way to be presently described.

Figure 1 in the accompanying drawings represents a vertical section of the boiler, A being the ash-pit and B the furnace. C is the vertical flue closed at the upper end by a cap or cover c, the communication from the center flue C to that which surrounds the boiler being through a series of tubes and running horizontally, or nearly so, to the space between the second and exterior cylinders. These tubes are marked D D D, and the outer space into which they open is marked E E. They of course operate as so many flues, the heated air from the furnace passing through them, and in doing so communicating its heat to the water by which they are surrounded.

Fig. 2 is a horizontal section of the boiler through one of the tiers of horizontal tubes, of which ten are represented in Fig. 1.

The same letters are used in both figures to designate similar parts.

F F F, Figs. 1 and 2, is the water-space between the tubes. The dotted line G, Fig. 1, is the water-line and H the steam-chamber.

The number of tubes passing horizontally

may be varied; but, as shown in the drawings, they would amount to eighty, there being eight in each of the ten tiers. To cause a circulation of water in the boiler, we place a number of tubes passing vertically through the space E and opening into the water at the upper and lower ends of the boiler. Two of these tubes are seen at I I. The number of these may vary; but we think that eight will be sufficient. The outer wall or crust of the space E E may, if preferred, be built of brick or other material; or if made of sheet-iron it may be surrounded by brick-work or other bad conductor of heat.

Instead of placing the tubes I I in the way described, we intend sometimes to surround what in Fig. 1 is the outer cylinder by a fourth, forming a space J J, Fig. 3, communicating above and below with the water in the boiler and allowing of a free circulation thereof. This space is also represented at J J, Fig. 2. The variation in the arrangement of the parts which will be rendered necessary by the substitution of this cylindrical water-space for the tubes will be apparent to every competent engineer.

We have not given any particular dimensions or scale of proportions, as these may be changed without altering the principle of construction and may be safely left to the judgment of those conversant with such structures.

We do not claim to be the inventors of the individual parts of the within-described boiler, concentric cylinders, and horizontal and vertical tubes, both of the passage of heated air and the conveyance of water being well known and having been frequently employed in boilers; but

What we do claim as our invention is—

The manner in which we have arranged and combined these cylinders and tubes, as herein set forth, constructing, as we believe, a boiler which is essentially new in its general character.

JOSEPH W. STRANGE.  
ELIAS STRANGE.

Witnesses:

A. BASSETT,  
CHS. I. H. BASSETT.